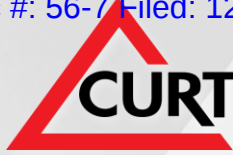


**Expert Report
of Dale Belman, Ph.D**

Exhibit VI



The Owners Voice to the Construction Industry
CONSTRUCTION USERS ROUNDTABLE

Confronting the Skilled Construction Workforce Shortage

WP-401
June 2004

**CURT Owner Member
Companies**

Abbott Laboratories
Air Products & Chemicals, Inc.
Ameren
American Electric Power
Baxter Healthcare Corporation
Boeing Company
Caterpillar Inc.
Citigroup
ConocoPhillips
DTE Energy
The Dow Chemical Company
E.I. Dupont De Nemours &
Company
Eastman Kodak Company
Ernst & Young
ExxonMobil Chemical Company
FMC Corporation
FirstEnergy Corporation
General Electric Company
General Mills, Inc.
General Motors Corporation
HCA Healthcare Corporation
Hercules, Inc.
Honda of America Mfg., Inc.
IBM
Intel Corporation
Johnson & Johnson
Kansas City Power & Light
Company
The McGraw-Hill Companies
MeadWestvaco Corporation
Merck & Company, Inc.
Owens Corning
PSEG Power, LLC
Pfizer, Inc.
The Procter & Gamble Company
Rohm and Haas

Shell Global Solutions (U.S.), Inc.
Southern Companies
Sunoco, Inc.
TECO Tampa Electric Company
Toyota Motor Mfg. North
America
Tyco International
U.S. Army Corps Of Engineers
U.S. General Services
Administration
The University Of Cincinnati

Associate Member Companies

Alberici Group, Inc.
BE&K
Bechtel
Egizii Electric, Inc.
Fluor Corporation
Hunt Construction Group
Jacobs Engineering Group
Rudolph/Libbe Companies
The Shaw Group, Inc.
Tetra Tech FW Inc.
Turner Construction Company
Zachry Construction Corporation

Association Associate Members

Associated Builders and
Contractors (ABC)
National Electrical Contractors
Association (NECA)
NEA – The Association of Union
Constructors
Sheet Metal & Air Conditioning
Contractors' National
Association (SMACNA)

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The purpose of this publication is to make available to industry the results of research and common owner practices. The information is provided solely for the individual consideration and education of CURT members and the industry. The publication does not necessarily represent the views of every CURT member company on this topic. The booklet is offered as an informational publication only. CURT intends only to synthesize current thought and trends concerning the topic. Neither CURT nor its committees make any warranty as to the completeness regarding the materials. Readers are encouraged to further research the topic before relying exclusively on these materials. Each CURT member and other readers of these materials are free, acting in its own discretion and its own perception of business self-interest, to reject or adopt the recommendations in whole or in part. Adoption and/or reliance upon these recommendations is strictly voluntary.

The Mission of The Construction Users Roundtable (CURT) is to promote cost effectiveness for owners doing business in the United States by providing aggressive leadership on issues that will significantly improve project engineering, maintenance and construction processes, thereby creating value for the owners.

Recruitment, education, and retention of craft workers continue to be critical issues for the industry.

1. Background

Major users of construction services agree that a growing gap between demand and supply of skilled construction labor is a major problem facing the construction industry. Predictions of shortages of skilled workers began in the late 1980s, when the United States Department of Labor issued its Workforce 2000 Study. By the mid-to-late 1990s, these shortages were a reality and fast becoming a serious problem. In a 1996 survey, the Business Roundtable found that over 60 percent of its members experienced shortages of skilled workers serious enough to affect project costs and schedule performance.

While the recent economic slowdown has lessened the immediate impact, shortages are still being reported. In 2002, The Construction Users Roundtable (CURT), the successor group to the Business Roundtable Construction Committee, surveyed its members and found that recruitment, education, and retention of craft workers continue to be critical issues for the industry.

The latest projections indicate that, because of attrition and anticipated growth, the construction industry must recruit 200,000 to 250,000 new craft workers per year to meet future needs. Regrettably, both demographics and a poor industry image are working against the construction industry as it tries to address this need.

2. Current Assessment

Recruitment

Worker Supply

Historically, the construction industry has populated its new workforce from an abundant supply of 18- to 24-year-old males of limited diversity. However, the number of potential workers in this age group continues its slow decline. At the other end of the spectrum, the current construction skilled workforce is aging rapidly. High attrition rates in construction are compounding the problem. The industry has always had high attrition at the entry-level positions, but now many workers in the 35- to 40-year-old age group are leaving the industry for a variety of reasons. All of these factors contribute to the difficulty of ensuring a steady supply of skilled craft workers in the future, as retirements outpace recruitments.

Industry Image

The image of the skilled construction craft worker has declined, also. The construction industry does not command the respect that it once did. Perceptions of the construction industry have changed as society and culture have changed. In today's society, people who do not go to college are often viewed as "failures." Skilled labor is perceived as too difficult, seasonal, dirty, and dangerous. Also, young people making their career choices can be highly influenced by an educational system that does not understand the industry and by parents and friends who are unaware of its many benefits and opportunities.

Recommendation

As a result of these conditions, the construction industry must look beyond its traditional pool of new recruits to a more diverse group of candidates. The industry must also initiate programs designed to improve the industry's image. These programs should be introduced to children at an early age and should target all prospective resource pools, including recent immigrants.

Retention

Although poor image may be the primary reason for recruitment problems, the lack of a well-defined career path is the main factor behind poor retention rates. Solving the retention problem and keeping skilled craft workers in the industry begins with a comprehensive and systematic craft training program and a creative and aggressive career development program. Industry press agrees with that assessment and has vigorously endorsed craft training in recent years. If retention rates can be improved, recruitment is likely to improve.

The union sector has historically funded and promoted craft training through their joint labor/management apprenticeship programs. These programs, along with those developed by the large open-shop contractors and their trade associations, helped supply the skilled workers needed through the 1980s and 1990s. However, the lack of standardized training in the majority of the open-shop sector has been taking its toll, as their market share has grown to 70 to 80 percent, according to Bureau of Labor Statistics.

Although apprentice training in the union sector is well-established and funded through collective bargaining agreements, the number of apprentices now being trained has been substantially reduced, as the union sector has experienced the effects of decreasing market share and image problems of its own.

The open-shop sector, through establishment of the National Center for Construction Education and Research (NCCER), has begun to standardize training curriculum, improve the quality and quantity of its offerings, and provide craft assessment tools on a national basis. Support for these programs among contractors, contractor associations, and association chapters is critical to the open-shop sector meeting its tremendous needs for more skilled workers in the future. But standardized curriculum alone does not deliver skilled workers—the challenge remains to implement training through local initiatives. The NCCER also must be instrumental in addressing the image problems that are hurting the industry.

Even with an improved standardized curriculum and an aggressive recruitment of qualified applicants, the open-shop sector must change its attitude on the value of training. Many successful open-shop contractors and some local contractor association chapters have recognized the value of training and have developed their own delivery systems, but the open-shop sector as a whole has not supported formal craft training and assessment to the extent necessary to effect real, meaningful, and lasting change. In the past, many open-shop contractors have succeeded by attracting skilled workers away from the union sector as market share shifted and by recruiting skilled workers from competitors as individual workload changed. This approach, while offering a short-term solution, is neither meaningful nor sustainable. The opportunity to continually use these methods is vanishing.

Why, then, do contractors not train? Many reasons are given. Some say it is cost-prohibitive. Others fear losing their investment when a trained worker moves to a competitor. They focus on potential negatives and fail to consider the productivity benefits of training. These attitudes must change and action must be taken to reverse this trend.

3. What the Industry Must Do

Image

The image problem must be addressed first. The industry must change young adults' perceptions of the benefits of choosing a construction career. The task lies individually in the hands of contractors, contractor associations, and labor organizations; however, owners must support the initiatives at both the national and local facility levels. Everyone in the industry is partially responsible for the negative image the industry currently has, and everyone must make an effort to improve that image.

All industry groups must emphasize the positives—the benefits of a career in construction, the myriad opportunities available, the outstanding accomplishments of individuals, and the importance of the construction industry, the nation's largest industry. While emphasizing the positives, the industry must also address the negative perceptions. Valid concerns should be addressed by the industry, and misconceptions should be dispelled with accurate information. The creation of the Construction Industry Image Improvement Task Force is a good start, but that effort needs to be actively supported by all segments of the industry.

Craft Training

Joint labor/management apprenticeship programs need to continually revisit their curriculum to ensure that craft skills are keeping pace with emerging technology and the needs of the industry. This includes updating the skills of the present workforce and aggressively implementing new technologies and approaches to craft education. Where practical, contractors should actively support these joint labor/management training programs.

The open-shop sector must continue its unified effort to create a standardized curriculum for each craft and to expand the delivery network so that all open-shop contractors nationwide have access to training centers. There are several excellent examples of regional training centers that are having an positive impact, but the reach is not yet sufficient to adequately address needs in all areas of the country. Individual contractors must recognize the necessity and benefits of training their employees and be willing to invest in it.

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Funding

Funding for training has long been a topic of discussion in the construction industry. Most of the dialogue has focused on the open-shop side, since training on the union side has always been provided and paid for as mandated in collective bargaining agreements.

In the union sector, a properly trained workforce was expected and virtually guaranteed by the union contractors, with training costs passed on to the owner.

That has not been the case on the open-shop side. Twenty years have passed since The Business Roundtable (BRT), as sponsor of the Construction Industry Cost Effectiveness (CICE) Project, first spoke out on the training problems in open-shop construction. A 1995 BRT publication advanced many of the ideas contained in this publication. It outlined the dangers facing owners and contractors due to the potential for craft shortages and the lack of a consistent training delivery method. The publication also addressed the lack of commitment to training by other than a small minority of the major contractors.

BRT urged owners to recognize that they have a vested interest in ensuring that contractors bring qualified, skilled workers to their project sites. Therefore, training costs are part of the contractor's cost of supplying services to the owner and the contractor should be entitled to compensation to cover those services.

The cents-per-hour voluntary contribution method used to fund open-shop training has worked only in a few areas. It has not received broad support from owners because they typically have no way to verify that the contractors are actually directing part of their fee to training. Many owners prefer to have contractors base their prices on both the direct and indirect costs (plus a reasonable profit) of delivering a quality product that meets the owner's needs. The costs a contractor incurs for providing a skilled, safety-conscious workforce should be invisible to the owner. It is the contractor's responsibility to determine how to do this in the most cost-effective manner to remain competitive and keep their customers—the owners—competitive.

Owners, however, need to recognize in their procurement practices the productivity value of an educated/skilled workforce.

Not that long ago, safety on construction sites was a matter of choice—contractors either chose to invest in improving safety or chose not to invest. Those who recognized the moral obligations and the financial benefits of performing work safely were the most successful. However, it took the owner community to really make safety a top priority. When the owners made safety a condition of employment, everyone benefited. And when safety became a requirement, there were no discussions of how to pay for it. The owners knew that any costs incurred to ensure safety was more than offset by the savings incurred on reduced insurance premiums and productivity.

Like safety, training is both essential and cost-effective long term. And as they did with safety, owners should require contractors to invest in training and maintain the skills of their workforce as a condition of employment. That approach could ensure that contractors make training a priority.

Like safety, training is both essential and cost-effective long term.

CURT Efforts

CURT endorses the NCCER as the primary resource for establishing training curriculum, performance standards, skills assessment, and certification in the open-shop sector. CURT continues to recognize and support a robust apprentice and journeyman training in the union sector and encourages the increased use of apprentice craftspeople on jobsites.

To recognize the achievements of those who are making substantive progress in the area of workforce development, CURT has established the Workforce Development Awards Program, which annually honors and recognizes contractors and allied organizations with significant achievements in these important areas.

4. Recommendations for Owner Companies

Owners must take the lead on driving training and education. The most effective and long-lasting changes in the industry are changes that are supported and encouraged by the owner community. Owners also need to be actively involved in efforts to improve the image of the construction industry and to recruit and retain workers.

CURT believes that owners must:

- ▲ Recognize the necessity of investing in training.
- ▲ Establish expectations in the areas of workforce training and development, workforce recruitment, and worker retention.
- ▲ Only do business with contractors who invest in training and maintain the skills of their workforce.
- ▲ Make contractor commitment to craft training a factor in the prequalification process. Owners should require the following in contract documents:
 - A description of the contractor's overall company training program.
 - Details on investments made on training.
 - Information on any specific training planned for the proposed project.
 - Specific methods used to evaluate skill proficiencies, such as skills assessment testing, rework measurement, repairs, weld rejection rate, etc.
 - Evidence of support for the continued updating and improvement of apprenticeship training and journeyman upgrade training in the union sector.

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- ▲ Support the NCCER initiatives as one approach to standardizing training curriculum, performance standards, and certification in the open-shop sector.
 - ▲ Provide proactive leadership and support for the development and implementation of craft training programs at the regional and local levels.
 - ▲ Develop, in conjunction with research entities such as the Construction Industry Institute (CII), improved methods to measure the effectiveness of craft training and delivery.
 - ▲ Provide proactive leadership and support for contractor, contractor association, and labor union programs that enhance the image of careers in construction, improve the recruitment of entry-level applicants, and increase worker retention.

5. Recommendations for Contractors, Contractor Associations, and Labor Organizations

The primary responsibility for recruitment, training, and retention lies with the contractors and their associations. Efforts must be made to improve the industry image and to educate potential entrants early on. Basic recruiting is the responsibility of contractors and should remain so, though with strong support from owners. It is also vital for contractors to focus on improving retention of workers. Finally, contractors must work with owners and researchers to develop standards (metrics) that measure the effectiveness of training investments.

CURT believes that contractors, contractor associations, and labor organizations must:

- ▲ Develop industry programs that enhance the image of construction as a career.
- ▲ Foster educational programs targeting parents, teachers, and others who influence the decision-making of the nation's youth. Emphasis should be placed on partnering with local school districts to develop programs that emphasize the opportunities available in construction and that communicate to each student the basic education standards required of the training program.
- ▲ Enhance industry and company programs designed to improve retention and continuing education of skilled craft workers.
- ▲ Invest in training curriculum and programs, to ensure that a qualified, skilled workforce is available to meet industry needs.
- ▲ Establish training delivery methods to actively train and certify craft workers in all geographical areas.

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- ▲ Actively participate in joint labor/management apprenticeship training in the union sector and determine return-on-investment for employer contributions to apprenticeship and journeyman training.
 - ▲ Support the NCCER in the development of standardized curriculum for craft training, skills assessment, and national certification in the open-shop sector.
 - ▲ Encourage the development of new and/or revised curriculum for craft training that meets the changing needs of the owner community.
 - ▲ Develop improved methods to assess the effectiveness of craft training, in collaboration with owners.

6. Recommendations for Local User Councils

In many areas of the country, owners have formed local user councils that function forums through which contractors, engineers, and the local owner community can address local issues affecting construction cost effectiveness.

CURT believes that, where these organizations exist, they must:

- ▲ Coordinate with area owners, contractors, and associations, to continually assess skilled craft worker availability by trade, and to develop short- and long-term projections for regional craft needs.
- ▲ Develop programs that enhance the image of the construction industry, promote its accomplishments, and tout its contributions to the community.
- ▲ Partner with local school systems to promote the construction industry as a rewarding career choice.
- ▲ Take a leadership role in working with associations and labor organizations in the delivery of craft training.

7. Summary

Construction owners, contractors, and labor organizations have been debating the issue of craft worker shortages for at least a decade, but have never made a collaborated effort to really effect a change. Now companies are experiencing significant problems in staffing construction projects, resulting in escalating costs and schedule delays. Current workforce shortages result from changes in demographics, a poor image of the construction industry and of construction workers, and insufficient craft training and career development.

The construction industry as a whole must address these critical issues now to prevent them from escalating further. The action items outlined here would be a start toward expanding the skilled craft workforce enough to meet current and future needs. To accomplish this goal, though, owners, contractors, and labor will all need to be active participants in the solution, not merely bystanders.

The construction industry as a whole must address these critical issues now to prevent them from escalating further.

Construction User Roundtable Publications

The purpose of developing Construction User Roundtable (CURT) publications is to disseminate recommendations, guidelines, and reports developed by the Construction Users Roundtable. CURT is focused on improving the cost effectiveness of the U.S. construction industry. These publications have been developed from the point of view of owners or users of construction services. Efforts by all segments of the industry, however, are vital if major improvement is to be the result.

This publication is one of a series from committees or study teams addressing a problem area.

Findings and recommendations of The Construction Users Roundtable are included in publication series classified as White Papers (WP), Reports (R) or User Practices (UP). In addition to these classifications, CURT publications are numbered based on the category of the topic:

| Category | Number Code |
|--------------------------------|--------------|
| Constructability | 011 to 099 |
| Contractor Management | 101 to 199 |
| Cost | 201 to 299 |
| Interface Management | 301 to 399 |
| Workforce/Industrial Relations | 401 to 499 |
| Material Control | 501 to 599 |
| Purchasing | 601 to 699 |
| Quality | 701 to 799 |
| Safety | 801 to 899 |
| Security | 901 to 999 |
| Strategy | 1001 to 1009 |
| Work Planning and Scheduling | 1101 to 1199 |
| Technology/E-Sourcing | 1201 to 1299 |
| Special Projects | 2001 to 2099 |

Examples:

WP-1201: A CURT White Paper on Reverse Auction

R-402: A CURT Report on Tripartite Initiatives

UP -801: A CURT User Practice on Construction Safety in Contractor Prequalification



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